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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

ODOM, CURTIS B

ART UNIT PAPER NUMBER

2634

DATE MAILED: 07/14/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/660,346

Applicant(s)

BETTS ET AL.

Examiner

Curtis B. Odom

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-7,10 and 13-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18 is/are allowed.
- 6) ☐ Claim(s) 1,4-7,10,13,14,19,21,22,25-30 and 33 is/are rejected.
- 7) ☒ Claim(s) 2,15-17,20,23,24,31 and 32 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 September 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 4, 5, 7, 19, 21, 25, 28, 29, and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Bergmans (U. S. Patent No. 5, 426, 671).

Regarding claim 1, Bergmans discloses a system (Fig. 1) to derive symbol timing for a receiver, comprising:

a slicer (Fig. 1, blocks 26 and 30, column 7, lines 4-11) configured to decode a received signal segment into a discrete data symbol;

a calculator (Fig. 1, block 21, column 7, lines 11-16 and column 8, lines 30-35) configured to derive a symbol (wherein samples contain symbols) timing phase error based upon the received signal segment and discrete data symbol, and configured compute an average based upon the symbol timing phase error; and

a circuit (Fig. 1, block 21, column 8, lines 34-39) configured to receive the average and configured to develop a control signal based upon the average;

an oscillator (Fig. 1, block 18, column 7, lines 9-19 and column 8, lines 35-39) that receives a control signal and that generates symbol timing for a receiver.

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Regarding claim 4, which inherits the limitations of claim 1, Bergmans discloses the circuit comprises a phase locked loop (Fig. 1, block 21).

Regarding claim 5, which inherits the limitations of claim 1, Bergmans discloses the oscillator is a voltage controlled oscillator (column 7, lines 9-19).

Regarding claim 7, which inherits the limitations of claim 1, Bergmans discloses the system is part of a point-to-point system (Fig. 1, column 6, lines 67-68).

Regarding claim 19, the claimed apparatus includes features corresponding to subject matter mentioned in the above rejection of claim 1, which is applicable hereto.

Regarding claim 21, the claimed method includes features corresponding to subject matter mentioned in the above rejection of claim 1, which is applicable hereto.

Regarding claim 25, Bergmans discloses a system to derive symbol timing for a receiver, comprising:

an equalizer (Fig. 1, block 14, column 7, line 59-column 8, line 8) configured to receive an incoming signal and to produce an equalized signal, the equalizer having a plurality of coefficients;

a slicer (Fig. 1, blocks 26 and 30, column 7, lines 4-11) configured to decode the equalized signal into a reference signal; and

a symbol timing calculator (Fig. 1, block 21, column 8, lines 30-39) configured to derive a symbol timing signal based upon the equalized signal and the reference signal (associated decisions).

Regarding claim 28, which inherits the limitations of claim 25, Bergmans discloses the symbol timing calculator further comprises means for comparing the

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reference signal and the equalized signal and configured to produce a symbol timing phase error (Fig. 1, block 28, column 8, lines 30-39).

Regarding claim 29, which inherits the limitations of claim 28, Bergmans discloses the symbol timing calculator further comprises an averager configured to produce an average symbol timing phase error based upon the symbol timing phase error (Fig. 1, block 22, column 8, lines 30-39).

Regarding claim 30, which inherits the limitations of claim 29, Bergmans discloses a control circuit (Fig. 1, block 22, column 8, lines 34-39) configured to receive the average symbol timing phase error and configured to develop a control signal based upon the average symbol timing phase error; and an oscillator (Fig. 1, block 18, column 7, lines 9-19 and column 8, lines 35-39) that receives a control signal and that generates the symbol timing signal.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6, 10, 13, 14, 22, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergmans (U. S. Patent No. 5, 426, 671).

Regarding claim 6, which inherits the limitations of claim 1, Bergmans does not disclose the oscillator is configured to generate symbol timing for a transmitter.

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However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the oscillator as taught by Bergmans (Fig. 1, block 18) could have been implemented into the transmitter in the same manner in which it was implemented into the receiver to produce symbol timing in the transmitter. Thus, claim 6, does not constitute patentability.

Regarding claims 10 and 13 which inherit the limitations of claim 1, Bergmans does not disclose the system is part of a multi-point system or that the multi-point system can operate on the following protocol: multiple virtual lines. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the system could have been implemented into a multi-point system to generate symbol timing for recovering transmitted signal. The type of protocol used would depend on the design specifications of the device. Thus, implementing the system of Bergmans into a multi-point system and choosing an operation protocol is deemed a design choice and does not constitute patentability.

Regarding claim 14, which inherits the limitations of claim 13, Bergmans discloses an equalizer in the system (Fig. 1, block 14, column 7, line 59-column 8, line 8). Bergmans does not disclose the equalizer is a fractionally spaced equalizer producing a plurality of coefficients. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that a fractionally spaced equalizer could have been implemented as the equalized to remove such interference as ISI from the received symbols. Thus, implementing a fractionally spaced equalized is deemed a design choice and does not constitute patentability.

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Regarding claim 22, which inherits the limitations of claim 21, the claimed method includes features corresponding to subject matter mentioned in the above rejection of claim 6, which is applicable hereto.

Regarding claim 27, which inherits the limitations of claim 13, Bergmans discloses an equalizer in the system (Fig. 1, block 14, column 7, line 59-column 8, line 8). Bergmans does not disclose the equalizer is a fractionally spaced equalizer. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that a fractionally spaced equalizer could have been implemented as the equalized to remove such interference as ISI from the received symbols. Thus, implementing a fractionally spaced equalized is deemed a design choice and does not constitute patentability.

5. Claims 26 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergmans (U. S. Patent No. 5, 426, 671) in view of Kim (U. S. Patent No. 5, 654, 765).

Regarding claim 26, which inherits the limitations of claim 25, Bergmans discloses the equalizer is adaptive (column 7, lines 4-5), but does not disclose a means of updating the equalizer based on the reference signal and the equalized signal.

Kim discloses a means of updating the coefficients an equalizer (Fig. 2, block 4) based on the equalized signal and a reference signal also produced by a slicer (column 2, line 23-column 3, line 48). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that since the equalizer of Bergmans is adaptive that it could have been updated using the teachings of Kim which would give the equalizer greater adaptability and allow for a more efficient removal ISI and noise caused by the transmission channel.

Regarding claim 33, which inherits the limitations of claim 25, Bergman does not disclose a DFE configured to receive the reference signal and to produce a DFE compensated signal; and a subtractor to subtract the DFE compensated signal from the equalized signal, wherein the resulting signal is input into the slicer.

Kim discloses a channel equalizer (Fig. 2, column 2, line 23-column 3, line 48) which includes a DFE (Fig. 2, block 6) configured to receive the reference signal and to produce a DFE compensated signal; and a subtractor (Fig. 3, block 5) to subtract the DFE compensated signal from the equalized signal, wherein the resulting signal is input into the slicer (Fig. 2, block 7). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was to modify the device of Bergmans with the channel equalizer of Kim to further remove ISI caused by the transmission channel from the signal to provide more accurate processing of the signal throughout the remainder of the device.

Allowable Subject Matter

6. Claim 18 is allowable over prior art because related references do not disclose a system to track symbol timing for a receiver including a centroid error calculator and a leaky integrator for receiving timing phase error and the centroid error calculation and for producing an average timing phase error based upon the timing phase error and the centroid error calculation.

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7. Claims 2, 15, 16, 17, 20, 23, 24, 31, and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 703-305-4097. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Curtis Odom
July 6, 2004



STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

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